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Air Gas.

By Thomas Wills, F.C.S.

If the necessity for some new scheme of artificial illumination is to be measured by the number of such schemes introduced into public notice, then the old and well-established processes must be in a very bad way indeed. From the number of methods for obtaining a gas to be used for illuminating purposes brought forward at the present time, and which are said to be so vastly superior, the manufacture of gas from coal would appear to be a very poor makeshift indeed—a thing to be got rid of and superseded at the very first opportunity. The directors of the various gas companies must, one would think, surely have lost, or be losing, that equanamity and sense of security which has for so long a time been the delight of the shareholders of such companies and the envy of outsiders. The daily-increasing number of provisional specifications and letters-patent taken out for the purpose of protecting and acquiring the monopoly for working certain methods whereby patent gases, new gases, air gases, and gases with the inventor's name prefixed, for want of better means of differentiation—all for the production of an illuminating gas which shall turn night into day at a most insignificant cost, and consequently beat all other schemes out of the market—must be viewed by all interested in any existing process with great alarm, and by the general public with a feeling of wonder that we should have continued so long under the old dispensation of things. Money, one would say, must be very plentiful, for most of these new, or quasi-new, ideas find undoubted support and some are in a fair way of being tried upon a commercial scale.

There can be very little doubt that the great amount of attention brought to bear upon this subject of illumination by gas must be productive of some good—if it be only to clear the way, by disposing of all unfeasible and impracticable processes, for the introduction of some really efficient and useful system, for it is impossible to conceive that such will not be in due time forthcoming.

Some of the new ideas for the carburetting of air or gas with the vapor of some volatile hydrocarbon have a good deal to recommend them, and for detached buildings or small villages and towns, will doubtless be to some extent adopted. All the air-gases—and their name is legion—proceed upon the same principle, and differ only in the apparatus and plant used; and certainly that scheme which overcomes most difficulties, and the working of which is most simple and efficient, will be the one most entitled to support. It has many times been pointed out what especial difficulties have to be encountered in this direction, the separation of the vapor of the spirit from the vehicle holding it in suspension being the chief, and this, depending as it does almost entirely upon the nature of spirit used, is removed beyond the reach of improved apparatus and machinery. It is generally accepted that a spirit must be used (if, as is usually the case, it be obtained from petroleum) of a specific gravity not higher than 0·660, with a boiling point of about 60°C., and as much below these limits as it is practicable to obtain and work it. Inventors should therefore see that the spirit which they purpose using is of such a nature as to give hope of success in use, and is, moreover, obtainable at a reasonable figure in continuous quantities. A second difficulty, not much less important than the first, is to prevent the reduction of temperature which any volatile spirit undergoes when air is bubbled or passed through it; and as this is not easily overcome by any arrangement of apparatus, it is usual to provide some means whereby the temperature may be kept constant by the application of external heat.

The last and most recent of these schemes deserves some consideration, as it appears to contain one or two feasible suggestions, and claims some ingenuity in the construction of the apparatus. From the specification which is taken out in the name of Mr. Wm. Wright, of Sheffield, we gather the following details:

A light petroleum, or other spirit, is to be used, as in other cases; but the apparatus differs from any that has as yet been introduced. A number of cylinders of iron or other metal are placed side by side, each being supported in a perpendicular position by means of trunnions, or swivel joints which allow of the cylinder being reversed with ease; in the interior of these cylinders there are fitted a number of fixed pistons formed of cotton or other spongy material. The number of these pistons varies with the size of the apparatus; a hollow chamber at the top and bottom of each cylinder acts as a reservoir for the spirit, which, in the first instance, is poured in excess through the top, and gradually percolates through the cotton pistons, at the same time saturating them; the excess of spirit accumulates in the bottom reservoir, air is then driven through the cylinder, and consequently through the saturated cotton. This air enters through the swivel-joint, and passes to the bottom of the cylinder, where it enters just above the bottom chamber, and has to find its way up through the pistons, out at the top just below the upper chamber, and thence down to the opposite swivel-joint—much, in fact, in the same way as the steam passes into and out of the cylinder of an ordinary oscillating condensing engine. After so much air has passed as to carry away in suspension the greater quantity of the spirit in the cotton, the cylinder is reversed, when the liquid that had accumulated in the lower vessel percolates once more through the pistons from the top to the bottom. In this manner it is found possible to place into the cylinder a known quantity of spirit that shall be sufficient to charge a certain volume of air, and to work it completely out by successive reversals of the apparatus. The swivel-joints are made also to act as stop-cocks, cutting off all communication between the inlet or outlet during the period occupied in reversing the cylinder. If a number of such cylinders are used, they are made to communicate with each other, so as to equalise the amount of spirit in each. The air used is supplied from two ordinary gas holders, but so coupled together by pulleys that one rises as the other descends, a valve opening inwards being placed at the top of each for this purpose.

Weights being added to the holder that is full, or, what comes to the same thing, some of the balance-weights being removed so as to allow the full weight of the holder to compress the air, this air is driven through the charging cylinders and can afterwards be used as an ordinary illuminating gas, at the same time the second holder is rising, and on the exhaustion of one the second is ready by a transference of the weights to supply a continuous stream of air. The work required to keep such apparatus in use does not seem to be great, an occasional reversing of the cylinders, and the removal or addition of weights to the holder being all that is necessary. Doubtless even this would be found impracticable on the large scale, but it is only intended to use this process for isolated buildings and small districts.

With regard to the character of the gas produced, it is much the same as other air gases, and subject to just the same laws; and, of course, this process can claim nothing more than an improvement in the apparatus used for carburetting the air. If gases are to come into use at all, and there seems to be no real obstacle to prevent their adoption to a limited extent, the direction for improvement must be looked for in the apparatus employed and this new patent certainly deserves a fair trial, which no doubt in good time it will have. Probably some means will have to be taken to prevent the reduction of temperature which invariably occurs when evaporation goes on at all rapidly; but as it is generally accepted that almost the shortest possible contact of the air and spirit is sufficient to allow of the former taking up as much of the latter as it is possible for it to do, this cooling may be confined to a very small extent, and may be neutralised altogether, if proper means be applied. It appears to be rather a difficult matter for inventors to obtain the best spirit for the purposes of carburetting air, for we have seen several samples of spirit supposed to be effective for such purposes, which would have been found, if used, of very little if any good, consisting, as they did, almost entirely of a light paraffine oil. The truth is, that very little of the real *spirit* from the petroleum comes into this country, its exceeding volatility rendering it a very dangerous freight for a ship; it might, however, possibly pay to have the petroleum sent over in its rough state, and to distil the spirit here. The oil, which is valued as

burning material, could be distilled afterwards, and it and the pitch remaining, would have little difficulty in finding a ready market. If the promoters of any one of the recent schemes could command a continuous supply of the light spirit at a reasonable figure, a great advance towards success would be made. That very great interest is still taken in these new schemes by the public is undoubted, and this last one is not likely to form an exception. Meanwhile there is nothing that should be relied upon but a fair trial on such a scale as shall be satisfactory to all.—*Iron.*

New Plan for Obtaining A Powerful Light.

The *Scientific American* takes the following from the British *Journal of Photography:*

Herr Edelmann, of Munich, has devised a very simple and satisfactory mode of obtaining a powerful light, well suited for photographic purposes, if the materials employed be judiciously selected. He has found that the oxyhydrogen flame produced from common coal gas and oxygen at ordinary pressure produces an intense light, of any desired color if, by means of it, we burn a mixture of picrate of ammonia with a suitable metallic salt.

To this end a hollow cone of hard gas carbon—similar to that used in electric lamps—is prepared of the following dimensions:

Height, one and three-quarter inches; diameter, one inch, tapering to three quarters of an inch, and pierced by a tube tapering in the same direction from half to one quarter of an inch. This conical carbon tube is placed, narrow end down, upon an upright oxhydrogen jet, the compound nozzle of which fits into the narrow end of the inverted cone of carbon. The oxyhydrogen jet is the usual kind of double tube, the coal gas issuing round the oxygen nozzle; and when the gases are ignited, they burn through the center of the cone, which then resembles a small carbon furnace one and a-half inches in depth.

The number of these cones to be made corresponds with the number of intensely bright colored flames required. When the gases burn in the ordinary way, scarcely any light results; but in order to produce the desired effects, we spread over the inner surface of a cone, with a spatula, a paste made by rubbing together in a mortar picrate of ammonia, the metallic salt desired, and alcohol. The cones are then allowed to dry at ordinary temperature, and placed over the double tube when light is required. To produce the the flame, the oxygen tube, which should be movable in a vertical direction, is raised as high as possible, the coal gas lighted, and the oxygen then turned on. By moving the oxygen tube slowly downwards, and regulating the gas supplies, the point at which the greatest brilliancy is produced can be readily ascertained. The light obtained is very intense and steady while it lasts.

If a white light be desired, sulphide of antimony or magnesium filings can be mixed with the picrate of ammonia; but if it be desired to use the light for showing on the screen metallic spectra, the chloride of sodium yellow, thallium green, iridium blue, and calcium are the most suitable; while Herr Edelmann finds that the chlorates or nitrates of strontium red, barium pale green, and copper deep green, afford the most satisfactory results. For photographic purposes the antimony would be most suitable, but it should be mixed with the picrate of ammonia with caution.

This plan of obtaining a powerful metallic light is specially recommended for illustrating some of the phenomena of spectrum analysis. At present it is usual to employ the electric light for the purpose of projecting spectra on a screen in order to exhibit them to a large audience. The cost and inconvenience of the electric light is, however, so great as to debar many from trying to exhibit these beautiful experiments. Edelmann now proposes the above plan for producing intensely brill ant metallic flames as a substitute for the electric meteod, and states that he has succeeded perfectly in projecting the spectra on a considerable scale when using the very simple and inexpensive source of light above described.

Chemical Repertory.

No. 102.—November 3, 1873.

EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

894. Sewage.—The Glasgow Sewage Committee have reported to the Town Council that after all their experiments, they cannot recommend any plan for the purification of the Clyde, so they suggest that a Royal Commission should be applied for in order to obtain the evidence of some eminent authorities.

895. English Patent.—E. F. Hughes, 223 Chancery Lane, London. An improved mixture or combination of fluids to be employed as a circulating medium in pipes used for warming and heating purposes.—This relates to the system in which pipes filled with heated water, air, mineral oil, or other matters are used for warming buildings, heating ovens, and other purposes; and consists in using glycerine in which is dissolved chloride of calcium or similar salts or matters capable of being dissolved in glycerine.

896. Ingenious Invention at the Fair.—There is a peculiar horizontal steam pump, Eickemeyer's, in a corner of the machinery department. At the middle of the piston is a short arm which, by a ball and socket joint, connects with a yoke on the fly wheel shaft. The piston has thus a partial rotation on its axis, and so forms a self-operating vaive for both pump and steam cylinder.—*Scientific American.*

897. Pavements.—The respective merits of asphalte and wood paving have been under discussion by the authorities of the city of London. When horses fall on asphalte their legs, it is urged, are "spread out," and they become injured for life. Falls on granite paving are not as a rule, attended with such serious results, nor do horses fall on wood paving to the same extent as they fall on asphalte. The question is still under discussion.—*Sci. Press.*

898. Temperatures of Coal Mines.—Apropos of the article on "the temperatures which man can endure," published by us lately, the following thermometric measurements made in the shaft of the Arley mine, in England, are interesting:

Total Depth.	Deg.	Total Depth.	Deg.
558 yards	78	745 yards	89½
605 yards	80	761 yards	90½
630 yards	83	775 yards	91½
663 yards	85	783 yards	92
671 yards	86	800 yards	92
673 yards	87	806 yards	93½
734 yards	88½	815 yards	94

The holes used in taking the temperature were made in the solid three feet, and allowed to remain thirty minutes before observation.—*Eng. and Min. Jour.*

899. Coal Consumption.—In a recent address by Mr. J. Lowthian Bell, author of the *Chemical Phenomena of Iron Smelting*, delivered before the English Iron and Steel Institute, the following interesting figures were given regarding the modes of consumption of the coal raised in Great Britain. Every 1000 tons raised in the kingdom is disposed of as follows:

In paper making and tanning	6
In smelting copper, lead, tin, and zinc	8
In water-works	14
In breweries and distilleries	18
In chemical manufactures	19
In railway work	26
In steam navigation	30
In articles of clay and glass, and lime kilns	51
In textile fabrics, of wool, cotton, silk, flax, and jute	42
In gas works	60
In mining operations	67
In coal exported to foreign countries	90
In general purposes, chiefly steam engines	121
In domestic use	172
In iron and steel works, inclusive of that required for their steam power	300
	1000

900. Another New Motor.—A new motor has recently been patented in America, the operation of which is as follows: Oil is sprayed into the cylinder behind the piston, and, being mixed with air, is ignited at the proper time by an electric attachment. The consequent expansion drives the piston forward, the momentum of the fly-wheel returning it to its former position. An ejector supplies the oil from the tank to the sprayer, the injector being connected to a piston blower driven by a crank attached to the main shaft. Street patented much the same thing in this country many years ago, using turpentine instead of oil.—*Jour. Society of Arts.*

901. Passage of Gases Through Vegetable Membranes.—The experiments of M. Barthelemy lead to the conclusion that the natural surfaces of vegetable tissue have, for carbonic acid, an admissive power which is from thirteen to fifteen times more considerable than that for nitrogen, and from six to seven times greater than that for oxygen. These experiments, proving the diffusion of carbonic acid through the cuticle of leaves, are of the same nature as the investigations of Dutrochet on membranes and aqueous solutions to determine the endosmose by the cellules.

902. Death by Lightning and the Sun.—One of the newspapers has done a service to the by no means small class of nervous people who are ill at ease in a thunder-storm, and who have an exaggerated fear of being struck by lightning. The Hartford *Courant* has been gathering statistics which show that the whole number of deaths in this country during the year 1870, from all causes, was about 500,000. Of these lightning caused 202. When the percentage is so small any one who considers it cannot well be nervous. The sun is really more dangerous than lightning, for the number of deaths from sunstroke in 1870 was 397, yet few people are so excitable as to borrow trouble concerning sunstrokes. If the public could be thoroughly instructed in the laws of percentage, we should have fewer panics, and consequently less mortality in time of epidemics.

903. Prepared Peat and its Use in Gas Manufacture.—The peat prepared by Henry Clayton's process—pressing out the water, grinding, compressing, and drying—was found to compare as follows with different coals in the amount of gas, etc., afforded:

	Cubic feet of gas.	Candle power.	Coke in cwt.	Lbs. spermaceti equiv. to gas furnished.
Staffordshire	7,200	22·42	13½	300
Derbyshire	7,600	11·71	17	305
Lochgelly	8,000	18	23	494
Wigan cannel	10,000	20.	13¾	686
Newcastle "	9,000	25·	13¼	840
Boghead No. 1.	12,500	41·	8	1,715
" " 2.	43,000	48·	6	2,222
Condensed peat of Belfast	10,500	15·65	8	2,713
Creavelen	9,240	28·75	8¾	594
Wales	11,000	22·50	7	849

—*Am. Chem.*

904. Carbolic Acid Ointments.—It is well known that rubbing the body with hog's fat has the effect of reducing the temperature of the skin in scarlet fever. A gentleman of our acquaintance has used the fat portion of smoked ham with beneficial results, and writes to the editor to disseminate the fact for others' benefit. A celebrated German physician recommends to incorporate one or two grammes of carbolic acid into one hundred grammes of lard, and, with this, to rub the whole body, excepting the head, two or three times a day, according to the intensity of inflammation characterizing the case in hand. The effect of this kind of treatment is to produce a pleasant feeling of coolness, to keep the skin softer, and after each application the temperature of the skin falls somewhat. The carbolic acid operates to destroy the germs and spores of the disease.—*Scientific American.*

905. Petroleum and Asthma.—The Titusville *Herald* says that asthma is of rare occurrence in the

oil regions, and that the cause of such exemption is found in the fact that the atmosphere there is thoroughly impregnated with the vapors of petroleum, which act almost as a specific for the relief of asthma, and at the same time as a preventive of consumption. It adds: "Let any one who is afflicted with asthma, and feels a particularly difficult spell of breathing coming on, go in the vicinity of a producing well, where petroleum vapor hovers in the neighborhood, and he finds a great relief; and continued presence in such a neighborhood, will be the means of a permanent cure."

906. Cold.—That very convenient chemical, the solution of chloride of calcium, is equal to either fortune. Refusing to boil, except at a very high temperature, it has been used extensively in the production of "tinned beef." Reduced to a temperature that would freeze almost anything else, it acts as an admirable handmaid to ammonia, and assists in freezing large quantities of Auatralian beef for the home market. The cattle we are told are killed in a frozen slaughterhouse, are kept down to a low temperature, and are shipped and preserved in that condition until reaching England. How the meat is kept down to a low temperature while in the ship is a mystery not yet divulged, but it is easy to divine that a small ammonia machine on board would produce all the cold necessary, and it is also possible to conceive that the meat being once properly frozen might be packed in air-tight tanks, carefully hedged in by a non-conductor. Speculation would be premature, as the first shipment of Australian beef preserved by the chilling process is now on the road to England, and the value of the new system will soon be tested by actual experiment.—*Iron.*

907. Carbolic Acid.—Carbolic acid is now so generally employed as a disinfecting agent, that a *resume* of the various forms in which it is made, in the largest establishment carrying on its manufacture in England (Calvert's), may prove of interest.

1. Solid carbolic acid of three different qualities, the point of solidification of which varies from 81° to 108° Fahrenheit.

2. Liquid acid of two different qualities, constituted almost entirely of cresylic acid. According to Mr. Calvert, the disinfecting properties of the latter substance are the same as those of carbolic acid.

3. Soaps in which the proportion of carbolic acid varies from five to twenty per cent, according to the uses to which they are to be applied.

4. Disinfecting powder, composed of silex and 15 per cent cresylic acid. The silex is obtained from alum factories, where kaolin is treated with sulphuric acid. The disinfecting acids become thoroughly incorporated with it, forming a dry and pulverulent substance.—*Scientific American.*

908. Tincture of Litmus in Sodium Light.—L. D'Henry has observed that the yellow colored light produced by a Bunsen burner with table salt, causes red tincture of litmus to appear colorless, while the blue litmus tincture has a black and ink-like appearance. This difference in the color is so marked that he considers it by far easier for the chemist to effect exact neutralisations at night or in a dark chamber, than by daylight. Even dark-colored syrups may thus be neutralized, without diluting them, the point of saturation being very readily observed, notwithstanding the coloration of the liquid.—*Am. Jour. Pharm.*

909. Foreign Coal.—The soul of the pessimist will rejoice at the news that dear coal has kindled into existence a host of competitors with England in the very production in which she thought herself absolutely pre-eminent. At a recent sitting of the Birmingham Chamber of Commerce, the dismal truth that America has entered the iron market as a formidable rival, was tearfully admitted. The same redoubtable competitor has begun to export coal, and bids fair to expel us r om the South American market, while we are compelled to hear that Australia is anxious to send her letters *via* San Francisco and across the American Continent, on the ground that her steam-ships will enjoy the advantage of starting from the cheapest market in the world. Efforts will be made to open up the immense coal-fields of China, but the absence of railroads will render this undertaking a work of time. A coal-field without direct railway or water communication with the seaboard, is simply a sort of mineral element for the time being, but in these days of progress even the "heathen Chinee" may be wrought upon to develop the immense resources of his country. At the present moment Chinese coal is dear in consequence of the difficulty of transport, but a few years of railways would render the Celestial an important member of the coal and iron trades.—*Iron.*

910. Diamond Saw.—At the American Institute Fair a diamond saw is at work in the machinery department, in the form of a neatly built iron model, one fifth the size of the more cumbrous wooden apparatus. The blade, it will be remembered, cuts through the stone by means of carbons or black diamonds which are securely set along its edge. There is an ingenious feed motion for moving the saw, and another device to lift the latter, consisting of an eccentric on the crank pin communicating with a knuckle joint and levers, so that it is allowed to cut only in drawing. The small machine exhibited, we are told, penetrated brown stone at the rate of fourteen inches and marble at seven inches per hour. A novelty about this invention is its application to the cutting of window moldings. Bevels are made by suitably turning the stone, and rounded edges by gradually moving the latter under the saw. The work exhibited to us was very smoothly cut. and especially noticeable for its clean and sharp angles. The apparatus. the inventor thinks, does the labor, in molding, of from twelve to fourteen stonecutters.—*Scientific American.*

Historical about Street-Lighting.

[From a communication to the *American Artisan* we extract the following interesting paragraphs:]

The discovery of a scientific principle, and its application to a new art, exerts a more powerful moral influence than any metaphysical dogma unverified and unverifiable by observation. For instance, let us compare the moral effect of physical and metaphysical light upon the metropolis of modern society—the city of Paris—whose population is composed of a majority of foreigners, representing all mankind. Limiting our observation to comparatively modern times, say two centuries ago, we find the state of morals to be as follows, according to the journal of a party of travellers passing through Paris:

"As soon as it was dark, the streets swarmed with thieves, and no one ventured out unarmed and alone. Those who could afford it hired torchmen to light their way, and esteemed themselves fortunate if they escaped unmolested. Carriages were provided with armed servants and lights"

How is it now, and why is it? Paris is said to be the safest and best regulated city in the world at night, because of the brilliancy of its gas-lights, rendering sufficient light for all ordinary business. Formerly, in case of tumult, which occurred much oftener than now, citizens of Paris were bound to place a lighted candle in the window, and a bucket of water on the steps, to guard against attack of robbers and incendiaries. An act of Parliament ordains that "a burning and shining light" shall be kept at the corner of each street from 10 o'clock P. M. until 4 A. M., to prevent robbery, housebreaking, etc. This light was made from pitch burned in an iron pot, such as fishermen use in the bow of their boat, or as burned at the foot of the statues of the Madonna and other saints—a dingy, lurid flame—mere darkness visible. Even this was extinguished during the political troubles of the Ligue and the Fronde. Civil war threw upon the streets crowds of assassins. Without light, without water, Paris was under the moral guidance of metaphysics, and St. Bartholomew furnished the light.

Louis XIV ordered torch-bearers to be stationed at points 800 feet apart, who were to be paid by the benighted traveler employing them, and who often aided the robbers and shared in the spoils. Lanterns, with tallow candles, were afterwards used, as we learn from the letters of Mme. Levigne, and the "Sentimental Journey" of Sterne. In 1698, Dr. Lister, of London, writes home that the lanterns are suspended from an iron rod, braced against the second story of the houses, twenty feet apart, hanging over the center of the street, and moved by a cord fastened to the walls. This cord explains the revolutionary cry "a la lanterne." Mme. Levigne writes to her daughter, "we drove home at midnight, protected from the robbers by the lanterns," (1673). Owing to a want of tallow candles, in 1709, the robbers had it all their own way. In 1766, reflectors and oil lamps, with cotton wicks, superseded the lantern and candle—1,200 reflectors doing the work of 8,000 candles. This was considered the *ne plus ultra* of street illumination, and in 1777 the grand avenue of Vincennes, from Versailles to Paris, was permanently lighted by fifteen miles of reflectors! The wonder of the world! During the revolution of '89, the lantern became more popular than the reflector.

During the restoration and reign of Louis Philippe, both were often destroyed by the mob to cover their operations, and as often restored by the government, as the only means of law and order. At the end of the reign of Louis Philippe, 8,000 gas lamps had been added to the lanterns ann reflectors. A scientific discovery, of French origin, had furnished a physical light, hitherto unknown, destined to revolutionize Paris, in a moral no less than in a material aspect, through physical means. It was reserved for hydrogen gas to redeem this Sodom, instead of destroying it by metaphysical brimstone. And the discoverer of gas was Rabbi Ezechiel, who lived in Paris during the reign of St. Louis—a conjurer, a sorcerer, familiar with the devil, and an expert in the black arts, using a lamp which burned without tallow, oil, or wick. He was known to the common people, who often told marvellous stories about his lamp; and his successors, in search of the philosopher's stone and the elixir of life, strove in vain to recover the lost art of the Rabbi's enchanted lamp, which they believed to have been lighted by a match from the infernal regions. In their experiments they accidentally stumbled upon the so-called "philosopher's lamp," by mixing sulphuric acid with metal filings and water, thus producing hydrogen gas, which is inflammable, and burns with a blue light—in itself, a mere toy for children. And yet, who can assert that these puerile efforts may not have been the incipient steps leading to the ultimate discovery of carbo-hydrogen, with all its illuminating, and heating, and motive properties, just as astrology led to astronomy, and alchemy to chemistry? However this may be, Phillip Le Bon—a Frenchman, a bridge builder, an inventive genius—whose sagacity seized all the consequences of the solution of a problem, was the first to indicate the means of preparing, purifying, and utilizing coal gas, the inflammability of which was well-known. Like most of the benefactors of mankind, who dare to innovate upon preconceived prejudices, he was hated, and suffered for the necessaries of life. Invention is the mother of necessity, as often as the converse; yet all Paris resounded with the miracle of Phillip Le Bon during the years 1799-1801. In 1804, December 2, the coronation day of Napoleon, he was shot by a ball aimed at the Emperor, who granted a pension to his widow.

It was not until 1815 that gas was practically and systematically introduced into general use, by a German, Winsor by name, residing in London, who acknowledged the claims of Phillip Le Bon to priority of discovery. The opposition to this innovation was fierce and protracted for years. As late as 1830 the old lanterns and reflectors, and even torch-bearers, were used in Paris. Intelligent and good men honestly believed that carbo-hydrogen caused the trees to die, occasioned asphyxia, destroyed paintings, faded curtains, set fire to the houses, blew up a barber's shop, and introduced the cholera and the seven plagues of Egypt.

Meeting of the Gas-Light Association of the United States.

A meeting af the above Association was held in the city of New York, on the 15th and 16th of October last, which was well attended by the representatives of some forty to fifty Gas-Light Companies of fifteen different States, embracing their Presidents, Secretaries, Engineers. and Superintendents, together with a number of Engineers who are actively engaged in the construction of gas works, and others who are largely interested in the business of gas-lighting in the United States.

The meeting being called to order by Mr. P. E. Demill, of Detroit, first Vice-President, it was announced that a previous engagement of the President, General Charles Roome, prevented his attendance, much to his own regret, as also the universal regret of the meeting.

The minutes of the meeting in April were read and approved.

The calling of the roll of membership resulted in responses from the following companies as present:

Atlantic, Ga.	Newark, N. J.
Adrian, Mich.	New Albany, Ind.
Buffalo, N. Y.	National Coal Gas, N. Y.
Brooklyn, N. Y.	Oswego, N. Y.
Beloit, Wis.	Pittsburg, Penn.
Bridgeport, Conn.	Paterson, N. J.
Columbus, Ohio.	Peekskill, N. Y.
Cleveland.	Rochester, N. Y.
Citizens, Brooklyn, N.Y.	Rockford, Ill.
Chicago, Ill.	Syracuse, N. Y.
Cold Water, Mich.	Sacramento, Cal.
Detroit, Mich.	Trenton, N. J.
East Chester, N. Y.	Tarrytown, N. Y.
Indianapolis, Ind.	Washington, D. C.
Irvington, N. Y.	Wilmington, Del.
Lansingburg, N. Y.	Waterford, N. Y.
Louisville, Ky.	Youngstown, Ohio.
Metropolitan, N. Y.	Yonkers, N. Y.

The attendance of a greater number of representatives was doubtless prevented, by the fact that at this particular season all gas companies are quite busy in preparing for the usually increasing consumption of gas—as well as the unfortunate omission to properly announce by a notice in this paper, the exact time and place of holding the meeting in this city at this time, and we are therefore prompted in this article to give a full synopsis of the proceedings of the meeting, for the benefit of those who found it impossible to attend, as well as to show to those companies who are in doubt, the expediency of becoming members of the Association.

At the organization of the Association in April last, it was not as fully perfected as was desirable; and considerable discussion was held, with the view of harmonizing the various ideas, and insuring its success; and through the action of a committee, with Mr. W. H. Price, of Cleveland, as chairman, such amendments to the Constitution were now reported and adopted as were considered necessary to give full effect to the objects of the Association.

The Executive Committee made a report on the objects and condition of the Association, which demonstrates the spirit of gas companies, to recognise it in its infancy and foster it in its growth, for the coming advantages to them, in thus having at these meetings, an interchange of experience, in the management of their business, that will assist in securing the best results to them and their customers.

Other committees on "Statistics," Insurance, etc., reported progress and were continued—and it was announced that Mr. W. H. Williams of Philadelphia would prepare for the next meeting a paper on the "Subject of Fire Insurance."

A goodly portion of the first day was occupied in discussing and explaining practical questions met with in the manufacture of gas; the annoyance caused by the collection of naphthaline in pipes, with several methods of getting rid of it, ellicited much valuable information; and the experiences given by the members who spoke on the subject, would no doubt prove of much benefit to all who heard, and who have had trouble from that product. Upon this subject, Mr. Herzog, Engineer of the Metropolitan Gas-Light Company of New York, was selected and requested to prepare a paper to be read at the next meeting.

Mr. Coombs, Supt., of Youngstown, Ohio, gave a description of his experience and method of preventing the stoppage of the stand pipes, by use of a water jacket surrounding and keeping them cool.

Mr. McIlhenny, of Washington, D. C., made some general remarks on the subject of "deposit of carbon in retorts," with his method of prevention, and promises to prepare a paper on this very important subject, to be read at the next meeting.

Mr. W. H. White, of Citizens' Company of Brooklyn next made a very elaborate statement of the operations at their works, in the use of naphtha gas as an enricher to the coal-gas, setting forth that at the present time they are making of coal gas, 200,000 cub. ft. per day, of the naphtha gas, 325,000 cub. ft., and also of what is known as the American Hydrocarbon gas, 75,000 cu. ft. per day. (The latter will be better known as the Gwynne-Harris process.)

As this subject is one that has claimed a good deal of attention from gas companies during the past 3 or 4 years, the remarks of Mr. White were very closely and critically listened to by the members; and to all the questions propounded to him, he gave satisfactory answers, and concluded by a general invitation to the Association to make a visit of observation and examination of the different processes employed at his company's works, which was largely availed of after the adjournment. Upon concluding his remarks, on motion, the thanks of the association were tendered to Mr. White for his interesting statement.

The subject of "Tar as Fuel in Gas Works" was also introduced, and amongst several plans that have been tried in various works, none appear to have been adopted as a success financially—although by some small companies that have no sale for their tar for manufacturing purposes, it is used, and permits a larger sale of coke, thus making the economy of its use.

For the ensuing year the following gentlemen were elected as the officers of the Association:

President, Gen. Chas. Roome, of New York.
1st. Vice President, P. E. Demill, of Detroit.
2d. Vice President, W. H. Price, of Cleveland.
3d. Vice President, E. T. Watkins, of Chicago.
Secretary and Treasurer, P. E. Demill, of Detroit.

A committee consisting of Messrs. W. H. White, H. Cartwright, and T. C. Cornell, were appointed to have a synopsis of the proceedings published in the GAS-LIGHT JOURNAL.

The time and place of next meeting was arranged to be held on the Second Wednesday of May, 1874, in the city of Cleveland, Ohio, after which the meeting adjourned.

Cape Breton Coal Fields.

A correspondent of the *Mining World* of London, writing under date of March 12, gives the following interesting data relative to these important coal fields. He says:

"Having been making inquiries into the extent and value of the Cape Breton coal-fields, with a view to their development, in 1866, when Governor Dundas was in Sydney, I write to supplement what his Excellency said respecting them in the *Times*. It so happens that only yesterday afternoon I had the pleasure of receiving a letter, dated February 19, from one of the most extensive coal-owners—and one of the most excellent citizens—of the island. Before quoting what he says about the present condition of the collieries, I would briefly refer to the state of matters there seven years ago.

"The General Mining Association of London, which had up to a recent date the entire monopoly of the minerals of the whole of Nova Scotia, was working very extensively at Sydney Bay and also at Lingan, C. B. These two pits were the only ones in the hands of British capatalists, and I may mention that the quality of coal at the former was good for household purposes. Of the Lingan coal I could learn very little in its favor. The International Coal and Railway Company were operating at Bridgport on an area of four square miles, and the calculation was eighty million tons of really good gas coal (seventeen-candle gas) to go and come upon. Not having the railway nor a very near prospect of it, the International shipped by means of barges what they could, weather permitting, and that was not one-tenth of what one gas company in New York would have taken from them. Col. Archbold was shipping freely at Little Glace Bay, at an artificial harbor he had formed there, and I was given to understand that his company had divided a very handsome sum shortly before. At Big Glace Bay, Mr. Pool was busy driving to the deep for the best coals of the Caledonia Company, while also engaged in making a harbor. His neighbors, the Clyde Company, were at a standstill for want of a proper shipping place. A few miles further on, at Cow Bay, Mr. Robert Belloni, an American, was going ahead famously in spite of drawbacks such as would daunt most men. He exported largely to New York and Boston. Clase beside him Messrs. J. D. Archibald & Co. were making a fair start—had everything in splendid order—at the Gowrie mines. There was a talk of something being done at Schooner Pond, but it was very unimportant then. One or two of the best properties in the colony were untouched through want of capital. Indeed, what money was supplied came chiefly from New York and Boston. Now for my correspondent's letter.

"'Sydney and its people are much altered since you saw them. Many strangers have poured in; new shops and new mansions, some of them very handsome, have been built, and new streets have been formed. We have three or four railroads from different mines to Sydney Harbor, with handsome, substantial piers. The Glasgow snd Great Britain Coal and railway Company is a British Association, having three or four collieries in operation from Schooner Pond to Sydney. (In the rear of Glace Bay and Bridgeport. This is in reply to information sought by me respecting that company.) Almost every coal area in the island is being taken up. You are aware that the duty has been reduced to half a dollar (by the United States Government, which levied a tariff of 5s. per ton on all imported coals from 1866), and that this year it will be done away with entirely. Coal property is, therefore, rising amazingly in value, and the remarkable circumstance is that now all our companies are English! We send coal not only to the States, West Indies, Brazil, Canada, and other colonies, but also to Great Britain and the East Indies, at remunerative prices. There is an extraordinary demand everywhere for Cape Breton coal. Several Englishmen are resident in Sydney, and throughout the coal region, engaged in the enterprise, and I wish with all my heart that more would come along. Scotchmen, with their energy and skill, would make fortunes fast.'

"With the exception of the General Mining Association works at Sydney Bar, all the collieries are on the Atlantic seaboard, and even the former is very near it.

"The advantages of Cape Breton are—abundance of coal and various other minerals (including the precious metals), abounding water power, navigable water being never more than seven miles away, plenty of valuable timber, a proportion of fairly good soil, all descriptions of fish common to the British Islands abound, and the climate is excellent. It is nearer Great Britain than any part of British America, to which railway communication extends; the taxes are light, and food exceedingly cheap. Beef and mutton in my day there—1865-6—cost from 2½ to 3d. per lb. Education is unsectarian, and excellent as regards quality. The militia used to turn out once a year for drill. No soldiers these except retired veterans. Not a policeman on the whole island.

"Labor was cheap: the mining of a ton of coal cost from 3s. to 4s 6d. The charge f. o. b. to gas companies, who contracted for a large supply, was 16s. per ton in gold. Seams 3½, 4, 4½, 5 to 6 feet, not more than 500 to 600 feet in depth, but many were only from 100 to 300 to 400 feet, and some were worked by means of slopes. Scattaree Island Light in Mira Bay is, I believe, the point for which many Liverpool vessels take bearings in going out.

"Yours faithfully, LLRIC MENZIES.

"Strome Ferry, March 12th.

"P. S.—I have endeavored to compress so much that I fear injustice has been done the subject, but I cannot help, however much I may regret, the circumstance."

Parisian Gas.—accepting the statements made as true, the Paris gas company, though a monopoly, gives to that city the best light in the world. Its supply is furnished through more than a thousand miles of pipe, and the company pays to the city $40,000 annually to the city for the right. It bears the cost of repairs whenever pipes have to be relaid, and pays more than $500,000 annually for taxes.

A "Quietly Happy Crowd."

The following, which we take from the *Cincinnati Daily Times* has been crowded out for some time, but "better late than never":

WILMINGTON, O., August 11.

Our beautiful little city has this evening, after seven long years of expectancy, celebrated the completion of her new gas works by brilliant and appropriate inaugural ceremonies. As the city increased in size and population some of the citizens, wishing to be up with the times, began to agitate the question of lighting the streets. Committees, composed of prominent citizens, visited the neighboring towns for the purpose of inspecting the various methods used, such as gasoline, coal oil, etc., but found none of these satisfoctory. At this juncture a proposition was received from R. T. Coverdale, Esq., of Cincinnati, for the erection of gas works here. A vote of the citizens was taken, some months since, on the proposition, and "Gas—Yes" carried by a large majority.

The City Council immediately opened negotiations with Mr. Coverdale, which were concluded satisfactorily, and a company was incorporated under the name of the Wilmington Gas-Light and Coke Company, with an authorized capital stock of $30,000, issued in shares of $100 each. Of these shares, over 260 have been taken already, and the balance will be taken in a short while. The company has organized with the following officers: David Sanders. President; T. Q. Hildebrant, Secretary; L. B. Welch, Treasurer; John Foster and B. F. Stanley, of Cincinnati.

Ground was broken for the erection of the works in the month of April, 1873; since which time they have progressed as rapidly as possible, and are now in active operation. They consist of a substantial and well finished brick building, comprising the "office," engine-rooms, etc., a well-proportioned tank, of sufficient capacity to furnish gas to a city of 20,000 inhabitants (this in prospect of the future growth of the city), and the various out-houses, sheds, etc., necessary to the carrying on of the works. Over two miles of mains have been laid at the present date, extending in one instance one-fourth of a mile south of the city, for the purpose of lighting the elegant new residence of Jeff. Hi debrant, Esq. Srxty street lamps have been erected under the direction of the City Council, a majority of the business houses have removed their greasy and unsightly oil lamps, which have shed a sickly light over the counters for so long a time, and replaced them by the more modern gas chandeliers, jets, and drops, and a large number of dwellings are resplendent with the new light. As several of the citizens of this place have labored for many yeats to accomplish the lighting of the city, this, the realization of their hopes, was thought a sufficiently important occasion to be celebrated by an inaugural jubilee, consisting of a grand illumination and banquet, the latter given by Mr. R. T. Coverdale. Soon after nightfall every gas burner available was brought into requition, and the city illuminated with a blaze of light from one end of her streets to the other. The inhabitants turned out almost to a unit, and filled the streets and pavements with a surging, quietly happy crowd of humanity. Gas jets in the shape of large stars shone from the lamp posts on the corners of the principal streets, while "patterns of light" of various devices were exhibited in front of the public buildings.

The large windows of the *Republican* office were one corruscation of light. A tiara of brilliant jets, displayed vpon the balcony of the Gates House, enclosed thd initials R. T. C., in honor of R. T. Coverdale, Esq., without whose energy and perseverance Wilmington would still be in darkness. Soon after the commencement of the illumination, Clark's Cornet Band paraded the streets, serenading each of the officers of the company in turn. Mr. Coverdale, with a party of invited guests from abroad, passed through, and inspected the works, which received many compliments for their architectural beauty, neatness, and general convenience. After a thorough inspection, the party gathered in the store room, where toasts were proposed to the success of the company, and were responded to by the Hon. B. F. Stanley, of Oincinnati, and Capt, T. Q. Hildebrant.

An adjournment was then made to the dining-rooms of the Gates House, where under an invitation from Mr. Coverdale, a large and brilliant company of ladies and gentlemen were assembled, "under the gas-light," in order to do honor to an elegant repast, gotten up in the highest style of the art by mine host of the Gates House, J. J. Stagg, who has long enjoyed the reputation throughout Southern Ohio of knowing how to provide such entertainments in the most artistic manner possible.

Coal Deposits.

BITUMINOUS, SPLINT AND CANNEL.—For a hundred miles of its course the Chesapeake and Ohio Railroad passes through and over the great Alleghany coal field, at the point of its greatest width, where the workable strata are most numerous, where the seams are of the greatest thickness, the varieties of the coal the most important and valuable, and the quality of the coal the purest.

The coal measures of West Virginia cover nearly 16,000 square miles. In the New River and Kanawha valleys the coal beds make their appearance at the surface, to the nnmber of fourteen distinct strata, with an aggregate thickness, at places, of 100 feet, of which more than half is in workable beds of from three to eight feet in thickness. By the erosion of the streams the coal seams crop out on the hill sides high above the water and railroad levels, in the most favorable position for easy, cheap, and safe excavation. The cost of opening mines is small, and as the ventilation and drainage are natural, the cost of bringing coal to the surface must always be cheaper than in any other coal fields in the world.

The principal varieties are the bituminous, the splint, and cannel. Of the bituminous, there are seams of different degrees of hardness and texture, from the friable or "fatty" coking coal, similar to the best of the Newcastle (England) coals, to the harder "block" coals with regular cleavage, similar to the Youghiogheny coals, so largely in demand in the Western and Southern cities. For household pusposes, for fuel and for the manufacture of gas, the Kanawha bituminous coals are equal to the best Pittsburgh or Cumberland coals.

The splint coal of the Kanawha is a hard, close-grained, dry burning variety, peculiar to this region, and is usually found here in conjunction with the seams of bituminous or cannel. Its distinctive features are a square, regular cleavage, and great purity, being nearly free from sulphur and earthy matter. It is also found to have great sustaining strength in the furnace-stack, which, together with its great purity, makes it more valuable for the manufacture of iron than any other mineral fuel discovered, since it can be used in its raw state, without coking. It makes a black, soft, malleable iron, which ranks in quality and price with "No. 1 foundry," or the best quality of charcoal iron. The presence of this valuable coal in such quantities, and in such position that it can be mined very cheaply, is of incalculable importance to Virginia, and to the furnaces in Southern Ohio and Kentucky.

Several tracts of coal lands have recently been purchased by Pennsylvania and New York capitalists and iron masters, with a view to the erection of furnaces near the coal mines, to be suppliek with ores from the rich deposits of the Alleghany region already described.

Splint coal of a very fine quality is now being mined and shipped over the railroad to the East and West, by the Kanawha and Ohio Coal Company, whose mines are located at Coalburg, sixteen miles above Charleston, directly upon the line of the railroad, their incline for the delivery of the coal from the mouth of the opening coming down the hill side to the track. The officers of the company are William H. Edwards, President, and John H. Platt, Secretary. They may be addressed for for fuller particulars at Coalburg, West Virginia, or No. 40 Wall street, New York city. Their splint coal is used in the manufacture of iron, which sells at Cincinnati at the full price of the best charcoal iron.

The cannel coal is found in great abundance, directly upon and within easy reach of the line of the railroad, at different points throughout the Kanawha Valley, in seams of from two and a half to eight feet in thickness, and of great purity.

It is equal to the best imported cannel for family use in grates, and is found by actual test to possess very great value for use in the manufacture of illuminating gas. The Manhattan and the Metropolitan Gas-Light Companies of this city, and others, have made satisfactory tests of its qualities for this purpose, and found it superior to most other coals in use, both in the quantity as well as in the purity and illuminating power of the gas which it yields.

The Peytona Coal Company, whose mines are located on the Coal River, and whose principal office is at No. 58 Broadway, in this city, and the Cannelton Coal Company, whose mines are at Cannelton, twenty-six miles above Charleston. and in sight of the railroad. and whose principal office is in Philadelphia, are now mining and shipping over the railroad in both directsons, very fine qualities of cannel coal, further particulars of which may be obtained by addressing them as above.

Other parties are preparing for the mining and shipping of cannel coal in large quantities. The price of imported cannel coal in this market for some years past has ranged from $18 to $22.

The cannel coal of the Kanawha region, which has hitherto been unavailable for want of the means of transportation to market, can now, by means of the Chesapeake and Ohio Railroad, be delivered here (New York) at from $10 to $12 per ton, ank pay a good profit to the miner, and can be supplied to the cities and towns along the Ohio and Mississippi Rivers and vicinity at still lower rates.—*Iron Age.*

Are We Witnessing the Formation of New Suns?

Some interesting observations have recently been made in regard to the colored stars about *Kappa Crucis*. Mr. H. C. Russel, of the Sydney Observatory sends to *Nature* an account of some observations which he has made in that portion of the heavens, and ventures the assertion that astronomers will gain fresh knowledge, especially with regard to the Nebular theory, by careful examinations of the phenomena developed in the direction of that beautiful cluster of stars.

Mr. Russell holds that it is beyond all question that from some cause, there has, as in the direction of *Eta* Argus, been recently developed a considerable increase of brilliancy about *Kappa Crucis*; also, that there has been not only there, but in other directions in the heavens, a sensible amount of "clearing up" within the last twenty-five years. In other words that the process of the formation of new systems of stars is actually going on, before the eyes of the astronomer: that suns, by careful observations, may be detected in all stages of progress from the greatest nebulosity, without form and void, to the finished sun, whatever that may be.

It is in this view, Mr. Russel thinks, we may find a rational explanation of the appearance of new stars in and about the *Kappa Crucis*. But, whether we admit this or not, one thing is certain; we are not yet prepared to say, with certainty, that such changes are not going on in space, as will suffice for a full explanation of the undoubted appearance of the small new stars above alluded to, if not of the greater changes about *Eta* Argus.—*Sci. Press.*

Asphyxia by Illuminating Gas.—The symptoms are discomfort, inclination to vomit, convulsive movements of the muscles, especially those of the breast, the skin is cold, the breathing and pulse irregular. The remedies recommended are exposure to free air, even if cold, irritation of the skin by vinegar, and the palms of the hands, soles of the feet, and the spine with a stiff hair brush, blowing air into the lungs. When consciousness returns, place the patient in a heated bed in a room with the windows open, and administer a few spoonfuls of Malaga, Madeira, or sherry wine. A mixture of tartar emetic and Hoffman's liquor, flavored with honey-water and orange-flower syrup, is spoken of as efficacious after the return of consciousness. E. W.—*Le Gaz.*

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Ed.

Gas Engine—Drawing Machine.

Gas Works, Montreal, Oct. 12, 1873.

Mr. Editor: There are frequently subjects of great importance to the gas world mooted in the Gas Light Journal, and which deserve more discussion and ventillation than they usually obtain, and touching which, I would sometimes like to "say my say" did time permit.

In looking over the number of the Journal to-day of 16th September last (omitted to be done when it was received), I find a number of subjects of more or less interest, which, with your permission, I would briefly notice, but only one of which I will confine myself to at this writing, viz., Mr. Havens's Retort Drawing and Charging Machine. Like many others I am looking out for the *best* machine for the purpose, and have therefore read the article thereon with avidity, and also carefully examined the wood cut illustration of it but truth compels me to say, with only partial satisfaction. I take the liberty of saying this not in the presumptuous sense of my individual impressions being of importance, but because these impressions I happen to know have been shraed in by some others, and doubtless by many others, and as no one else has thought fit to take the matter up, I have ventured to say this much, with the view of eliciting further information on a question of so much importance.

Steam stokers, it must be admitted, have hitherto been somewhat complex, and as the desideratum in this as in all other kinds of machinery is to produce a machine capable of performing all the work required in a satisfactory manner, with the fewest possible working parts, and with the greatest simplicity of action, the inventor of the machine in question has apparently been more successful than others, if the engraving is a faithful representation of it, and if it performs the several portions of the required work, as well as the more complicated ones in use. But it appeans to me that *but part of the machine is shown in the engraving.* For instance, the engine and boiler are not shown, as they are as necessary as the parts shown, and they must be either stationary or movable, in either of which cases certain additional parts become necessary. Then, again, an essential part of similar machines is the feeding of the scoop or scoops from a hopper above, carried and worked by the machine, saving the cost of manual labor in filling from the floor. In the Somerville and Robinson's machine either mode may be adopted, feeding from above where practicable being the preferable way. But there appears to be no such provision in the Havens's machine. If there is it is not shown as it should have been, and if there is not, that part at any rate would appear to be a beautifully "simple kind of simplicity"—after the manner of a person living economically by the "simple" expedient of omitting his dinner.

One would like to have more definite information too, as to the cost and capabilities of the machine. Instead of the good humored string of truisms equally applicable to any description of machinery, about the machine not asking for higher wages or shorter hours, and its never exhausting its energy (although for the matter of that, I am afraid it will be subject to the contingencies of other machinery, in "exhausting its energy" by sometimes breaking down), and so on, it would have been more satisfactory to have published an approximation at any rate of its entire first cost, the expense of working it, in labor, fuel, oil, etc., and the number of retorts it is capable of drawing and charging per twelve hours. If this were done every reader would be able to compare its working with that of manual labor, as well as with the published results of other machines, and so ascertain its advantages clearly, and it is to be hoped the inventor will see the desirability of adopting this course, and of publishing a detailed description of *all* its parts.

Promising (with your indulgence) to glance at some of the important subjects alluded to above, in your next issue, and begging to assure Mr. Havens that the above remarks are penned in no spirit of captiousness, but simply to recount the impression his "half told tale" is calculated to convey, and to elicit further information. I am yours truly,

E. S. Cathels.

The Largest Engine in the World.

W. L. C. states that, some time since, the New York *Times* mentioned the pumping engine of the Lehigh zinc mines, at Friedensville, as "the largest stationary engine in the world." A writer in a Pittsburgh paper assails the above statement, and endeavors to show that the engine above mentioned has not even an approximate claim to that distinction, and he states that the great Haarlem engine has a 12 feet cylinder with a 10 feet stroke, and he makes its capacity to be 10,000,000 gallons raised one foot high in 24 hours. "Now, 10,000,000 gallons is 83,388,000,000 foot pounds per day, or 57,908,333 foot pounds per minute, equivalent to 1,755 horse power. But the designers themselves only claim 500 horse power for their engine, and must feel flattered by the Pittsburgh estimate. The Lehigh engine was originally designed and rated at 3000 horse power, and, if called upon, could increase even that figure. Where, then, is the comparison?

The famous engine of Haarlem is nothing but a familiar single acting Cornish engine, having an 84 inch cylinder, with the attachment of Simms' combined cylinder, which is also single acting. Its normal speed is six strokes per minute, and who can make more than 500 horse power out of that at any reasonable pressure? But the Lehigh engine is a beam engine with a plain cylinder 110 inches in diameter, 10 feet stroke and double acting. It is now working at 11 strokes per minute, or a piston speed of 120 feet. What is there, then, in the Haarlem engine to entitle it to rank above the engine at the Friedensville mines?

I suspect, however, that my Pittsburgh friend would care little for the reputation of the Haarlem engine, if his own could be shown to be the veritable leviathan. But he describes his engines as having two 64 inch cylinders of 14 feet stroke geared to one shaft and fly wheel, each actuating two pumps, and each capable of working independently. Two 64 inch cylinders give an aggregate piston area of 6,484 square inches, while the piston area of the Lehigh engine is 9,504 square inches, or nearly one half greater. In fact, we have half a dozen blowing engines in the Lehigh valley which show a greater volume of cylinder than that at Pittsburgh. The Lehigh engine was designed by Mr. John West, the company's engineer, to bear a pressure of 60 lbs. with a factor of safety of eight, or a pressure of 80 lbs. with a factor of six.

Finally, the justice of comparing, at all, the work of the Pittsburgh engines, which are practically two distinct engines, with the single engine of the Lehigh zinc mine is not to me apparent."—*Sci. Amer.*

The Gas Supply to the City of London.—On Wednesday was issued the report of Dr. Letheby, the chief gas examiner, on the result of daily testings of the gas supplied to the city during the past quarter, the returns extending over the months of April, May, and June. The results showed that the average illuminating power had ranged from 16.95 sperm candles at Cannon street, the illuminating power of the gas had been equal to the requirements of the Act of Parliament, but on those occasions it was a little below the Parliamentary standard. The gas at each of the testing places had been constantly free from sulphuretted hydrogen, and the proportion of sulphur had never exceeded the quality (20 grains per 100 cubic feet) prescribed by the referees. The amount of ammonia in the gas had ranged from a maximum of 1.5 grains per 100 cubic feet at Beckton, 1.8 grains at Cannon street, and 2 grains at Friendly Place, to 0.0 per 100 feet. The averages were 0.36 of a grain at Beckton, 0·30 at Cannon street, and 0.53 at Friendly Place.—*London Times, Sep.* 13.

A Great Irrigation Scheme.

The Sonoma (Col.) *Democrat* publishes some interesting facts furnished by Captain J. L. Smith, of Yuma, who settled in Arizona twenty-five years ago. He is of opinion that the Colorado Desert will eventually be a very fertile region. He declares that the grossest misconception exists concerning the vegetation on the desert. The soil is the richest in the world, and on those portions overflowed by New River the grass is the tallest, thickest and richest he ever saw. One man has a mowing machine, and is engaged making hay, which is of superior quality. In New River, the Captain says, there is a natural ditch, which it would only require a few thousand dollars to make available for the irrigation of hundreds of thousands of acres of land. Abundance of water can be obtained from artesian wells. The overflow of the Colorado often spreads itself for a distance of ninety miles, presenting at stages the singular spectacle of a river running up hill.

The desert is about fifteen feet below the level of the bed of the Colorado, and its waters can thus be carried over the desert. For such portions of it as cannot be thus reached the artesian well remains. Water can be got anywhere at a depth of from 12 to 20 feet. The informant was employed by the United States government to dig wells on the desert. In digging the well at New station, which was four feet square, after working his way through thirty-five feet of clay, he broke into what appeared to be the bed of an old river. He came across specimens of wood. Here he tapped a stream of water which rose within one hour sixteen feet in the well, and which has stood at that depth ever since. It is impossible to exhaust it. If this stream had been tapped by a fourteen inch main simply, instead of an opening four feet square, he is positive that it would have sent a flowing stream to a height of sixty feet.—*Exchange.*

An American Coal-Cutter.

We give an account of the recent trial of the first practical coal-cutting machine in the United States. The machine is employed in the Coal Brook mines of Messrs. Niblock, Zimmerman & Alexander, situated about two and a half miles north-east of Brazil, Indiana, and is known as Brown's Monitor Coal-cutter. The machine consists of a five horse-power steam engine, driven by steam carried into the mine by a steam pipe, terminating, however, in a few feet of rubber hose, which permit of full freedom of motion to the machine. The intention of the proprietors is to employ compressed air in place of steam as soon as their experimental trips are finished. The cutting arrangement is an iron rim of four feet in diameter, which has on its periphery movable steel teeth, placed at points about twelve inches apart. These teeth may be taken out and ground whenever they become dull. This rim lies on small wheels which support it and allow a free motion, and has cogs on its under surface which gear into cogs on a shaft turned by the engine. By this means the power is applied near the circumference of the wheel, instead of at the centre, as in the ordinary circular saw. The principal reason for this arrangement is to get a deeper cut at the coal. The cutter can be put to a depth of three and one-third feet or seven-eighths of its whole diameter, whereas the ordinary circular saw can scarcely cut to one half of its diameter. The machine runs on a movable track, and is fed by means of a screw working in cogs. The track is put down along the side of the coal at the proper distance from it, and when a cut has been made the whole length, the machine is put on tracks and wheeled to the next room, where the track is laid as before, and so on through the mine. The duty of the machine is put down at about a yard in five minutes. The estimate of its economy given by the proprietors is, that it saves about 35 cents per ton over the cost of putting out coal by hand labor, which, in a mine turning out say 200 tons a day, amounts to a saving of $70 per day. The first cost of the machine in addition is very moderate, being only about $800. —*Dr. Wahl.*

Smedberg's "Synopsis."

The following additional subscribers to the above work are herewith acknowledged, making 303:

Lewis Collins, Covington, Ky., P. O. Box 867.
Memphis Gas Co., Memphis, Tenn.
Cortland Gas Co., Cortland, N. Y.
John Drew, Gas Works, Mobile, Ala.
W. H. Spencer, 710 Nostrand Av'e, Brooklyn, N.Y.
W. S. Tate, Sup't Gas Works, Mattoon, Ill.
W. W. Goodwin, Phil'a, 1 copy, half Russia.
J. O. King, Sup't Gas-Light and Coke Co., Jacksonville, Ill.
H. A. Brooke, Sup't Peoples Gas Co., Albany, N.Y.
George W. Gift, Gas Co., Memphis, Tenn.
A. F. Havens, 61 Broadway, N. Y., Room 35.
Mobile Gas-Light and Coke Co., Mobile, Ala.
Atlanta Gas Co., Atlanta. Ga.
John Cummings, Metropolitan Gas Co., Brooklyn.
Arthur Brown, Sup't Gas Co., Wheeling, Va.
A. J. Moulder, San Francisco, Cal.
Taunton Gas Co., Taunton, Mass.
E. M. Breese, Sup't and Eng'r Detroit Gas Co.
David Milne, Sup't Gas Co., Corning. N. Y.
Frederick S. Benson, Eng'r Nassau Gas Co., Brooklyn, E. D.
Titusville Gas and Water Co., Titusville, Pa.
E. F. Cooley, Sup't Lansing Gas Co., Mich.
C. P. Russel, Sup't Gas Co., Houston, Texas.
William L. Duncan, San Francisco, Cal.
Frederick A. Sabbaton, 1 copy additional.

ADVERTISERS IN THE "SYNOPSIS."

Wm. Wallace Goodwin, Phil'a, Pa., half page.
Maurer & Weber, New York, quarter page.
T. F. Rowland, New York, one page.
American Coal Gas Light Improvment Co., 1 page.
Smith & Sayre Manufacturing Co., half page.
Herring & Floyd, New York, full page.
William Farmer, New York, half page.
Hawkins & Cantrell, San Francisco, xuarter page.

Public Schools and Gas Companies.

At the regular meeting of the Board of Education yesterday (October 15), the City Superintendent reported that the evening schools which were opened on the 6th inst., show an attendance of 7,993 males, 3,379 females, and 103 in the colored schools; total, 11,475. The nnmber of teachers connected with these schools is 343. No return has been made of the evening High School. The average attendance in grammar and primary schools for September was 89,617, or 4,278 greater than the corresponding time last year. On the 6th inst. primary School No. 21, in Third avenue, near Forty-ninth street, was opened and has received a large attendance of pupils before untaught. The whole unmber of days of absence among teachers is 1,240, or 656 less than last year.

After a long debate on the legality of an appropriation in gross for the amount, $1,500 was voted to the Normal College for the purchase of philosophical instruments. Commissioner Farr explained that they could not be obtained by advertising, as the greater part must be made to order. Appropriations to the amount of $2,600 were rescinded for various reasons.

The Committee of Audit had investigated the extravagant consumption of gas in school buildings, but were unable to discover the cause. Commissioner Jenkins said that the Committee were seriously in doubt as to auditing some of these claims which show discrepancies of $50 a month in the case of similar buildings. The committee were further perplexed by the fact that the Gas Company informed them that the amount charged passed through the meter, while experts testified that the given number of cubic feet could not be passed through it in the time allowed. A resolution was passed requiring a monthly report from the gas companies, which should be transmitted to the trustees of any building in which an extravagant consumption was noticed.—*Daily Papers, October* 16.

Water-Supply of Philadelphia, New York and London.—By the kindness of Dr. W. H. McFadden, chief engineer, we are furnished with the following figures, showing the present daily capacity of all the water works of Philadelphia:

Fairmount, 42,000,000 gallons; Schuylkill, 26,000,000 gallons; Roxborough, 5,000,000 gals.; Delaware, 12,000,000 gals. Total, 103,000,000 gals. Proposed works at Frankford 10,000,000 gals.

The official report of the chief engineer of New York city states the daily average quantity delivered by the Croton Aqueduct, New York city, to be 115,000,000 gals.

Professor Frankland reported to the House of Commons that the daily quantity of water supplied to London by the eight companies, during the year 1871, was as follows:

Wholesome water, from deep wells and springs in chalk, 20,000,000 gallons; impure water, from polluted rivers, 87,000,000 gallons. Total, 107,000,000 gallons. But of the pure water, 12,500,000 gallons (the New River company's share) are allowed to mix with 11,000,000 gallons of polluted water before distribution, leaving only 7,500,000 gallons strictly pure water daily for the city of London.—*Am. Exch. and Review.*

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☞ All communications to be addressed to "THE EDITOR, No. 42 Pine Street, Room 18, New York.

MONDAY, NOVEMBER 2, 1873.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

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SPECIAL TO THE GAS FRATERNITY.

We would respectfrlly invite you to communicate to our columns, which are always open to freedom of speech, in the interest of all matter pertaining to gas. Yet in justice to the public demand and yourselves, our columns shall be free and untrammeled. We cannot therefore even in accordance with the views of some, confine its space to any special organ or sect, but most heartily welcome and solicit the correspondence and discussion of those who have heretofore witheld the knowledge of their years of test and experience, thereby imparting great benefit to the country at large, and assisting to establish *more thoroughly* this basis, through the medium of the GAS-LIGHT JOURNAL, whose chief object is to increase by circulation, gas interests, yet in its childhood in ahis country.

PETROLEUM FOR GAS.

This Journal, being the sole exponent of the literature and progress of gas-lighting in the New World, is hence under obligation to afford what information can be collected and accumulated, relating to possible modes and materials, to be used in increasing economy in the attainment of the end; which end should be the greatest and *most diffused* illumination attainable at the smallest cost. In the attainment of this end, *all* the elements that enter into the problem are of course to be considered. Mere candle power is in itself not a paramount consideration; one-hundred-candle gas is of no practical use, being unmanageable by both producer and consumer, either as an article to be stored, distributed and measured by the former, or to be consumed by the latter. All sorts of new difficulties and embarassments would arise out of the attempt to distribute throughout a city, a gas which must necessarily have a specific gravity greater than that of air, and which therefore would require, in order to drive it rapidly throughout a long and complex distribution-system, pressures which would be impracticable, or such complete and fundamental modifications of our whole apparatus as to involve a delay of several years to make and perfect the new inventions that would be required.

For these reasons, as well as for others inherent in the case, whoever has become convinced—as the present writer has, for one—that petroleum has far more candle-power in it, weight for weight and bulk for bulk than any other cheap and common substance, will naturally begin to consider how we shall proceed to make this enormous sperm-equivalent available for practical purposes on a large scale.

The writer does not doubt that gas men generally will agree that the mode that must be devised of effecting this end, will involve a *dilution* of the rich petroleum gas in some way; and the best way will obviously be that which does not introduce into the mixture or product, any inert gas, that is, any gas which (like nitrogen, or carbonic acid, for example) involves a dead and absolute loss of energy by detracting from the temperature of the flame.

So far as our present lights go, it seems as if we would have to settle down for a cheap and effective dilution of our petroleum gas, upon that much scorned and maligned product, *water-gas*; using the term in a broad sense, as including all possible modes of accomplishing the dilution or extenuation of the products of gasefaction of petroleum, by those of the gasefaction of steam, through the agency of incandescent carbon. This, whether the carbon be extraneous to the petroleum, or that carbon which is inherent in its own conftitution.

Of course the strife between inventors will be towards the most perfect and cheapest mode of attaining this dilution. These gentlemen are frirly at work at the problem, and it remains to be seen whether they will improve upon the simple and obvious plan of making the petroleum gas and the water gas separately, and mingling them at will.

Much ink and inanity have been shed of late in support of the proposition that making gas from water is a work of supererrogation; because, forsooth, it is assumed that nothing more could possibly be realized from the gas (as fuel) than directly from the fuel consumed in producing the said gas. Nice and precise, in theory, but fallacious in practice; as everybody who has had any real experience with fuel in gaseous form—its manageability and susceptibility of exact regulation to the work to be done—will concede.

The question we have in hand, however, is not fuel, but light; and it would seem that the theorists referred to may be in danger of shedding darkness rather than light upon the subject, though it may be that their deeds are not (consciously, but only heedlessly) evil.

Another promising line of experiment, to which some attention has already been given in these columns, is the use of petroleum-gas simply as an enricher of coal-gas. The consumption for this purpose alone, however, as we have become convinced by recent well-founded estimates, could not be large enough to provide new consumption, commensurate with the enormous volumes of this oil which is now poured forth from the rocks. Our own recent cogitations upon the "logic of events" leads towards the view that at least over a considerable territory of the United States, rock oil may soon prove a substitute, to a considerable extent, as well as a subsidiary to coal, in the making of gas for public distribution.

The inventors, nevertheless, have still much work to do.

MR. CATHELS ON THE HAVENS RETORT-CHARGING MACHINE.

In our "Correspondence" will be found a letter from Mr. Cathels, of Montreal, criticizing, though in a generally courteous tone—worthy of emulation in such cases—the cut and specification we have put before the readers of the Journal, of Mr. Alonzo F. Havens's Machine for introducing the charges into retorts.

In advance of any reply which Mr. Havens may have to make, we would state what we ourselves conceive to be the reasons of the apparent deficiencies in setting forth the invention, that are pointed out very properly by Mr. Cathels. This is, in fact, incumbent on the writer, as will be seen, when it is stated that all these points were inquired into by him on the occasion of his first examination of the machine in operation in Brooklyn some months since, and were fully and satisfactorily explained. Probably the best way to reply to Mr. Cathels will be to simply transcribe portions of the same notes here:

In his work of simplification, Mr. Haven has aimed at disconnecting the working parts from each other, making each piece capable of being removed and replaced by another, without deranging the other parts or delaying the work, as no part liable to breakage will require more than 20 minutes to replace.

Another great advantage is its perfect auto

matic action requiring but one movement on the part of the attendant, who may be a boy, as he has nothing to do but to pull on a lever to start the scoop, when it runs into the retort, and at the proper time deposits the coal, placing the most coal at the back of the retort, where the heat is the greatest, and leaving no vacant space to fill rapidly with carbon, and form the "butt" or nucleus for carbon deposition, which is injurious to the retorts and leads to consumption of so much unnecessary fuel; occupying also so much space. The scoop then locks itself open and reverses its movement, running out of the retort on the carriage or guide; and when it has run back sufficiently to clear the mouthpiece of the retort, it unlocks or closes by its own weight and stops, ready to receive a fresh charge. All these movements are capable of adjustment to suit any length of retort, and to insure that the work is done perfectly and independently of the will of an operator who may, through inattention, run the scoop against the back of the retort or not run it far enough back, thus injuring the retort in the first case or not depositing the coal where it should be in the second.

It requires no special boiler and engine to operate it, but can be worked by any power found where the machine is used, which can be transmitted to it by means of a rope, acting upon a grooved wheel which can be placed at either end of the machine. Or a gas-engine can be mounted on the carriage, with a rubber tube connection to openings in the wall of the retort house. This will be quite sufficient, as the amount of power required is so small that in case of necessity the scoop can be worked by hand.

For charging the machine, it is proposed to have stationary coal-bins at intervals, under which the machine runs on its rails, and into these bins the coal can be deposited from the boats or cars. These bins are provided with openings in their bottoms, through which the coal can be dropped into the hopper, which is carried on the charges but not shown in the cut; which hopper holds enough to supply the retorts in one line extending from one stationary bin to another.

[Editorial Note.—Erratum—There was a slip of the types in our article on the above subject of Sept. 16, which may have produced misapprehension. See page 102, 26th line from bottom of middle column—"supplemented" should be *supplanted*, changing the meaning materially It was corrected in the proof, but escaped attention after all.]

THANKS FOR THE PICTURESQUE.—We have received through the kindess of Mr. F. A. Sabbaton, of Albany, N. Y., a fine photograph of the new Peoples Gas-Light Company of the abovenamed city. These works were built under the personal supervison of Mr. Sabbaton. We understand that it is a perfect likenessof the buildings and are very much indebted to Mr. Sabbaton for his kindness.

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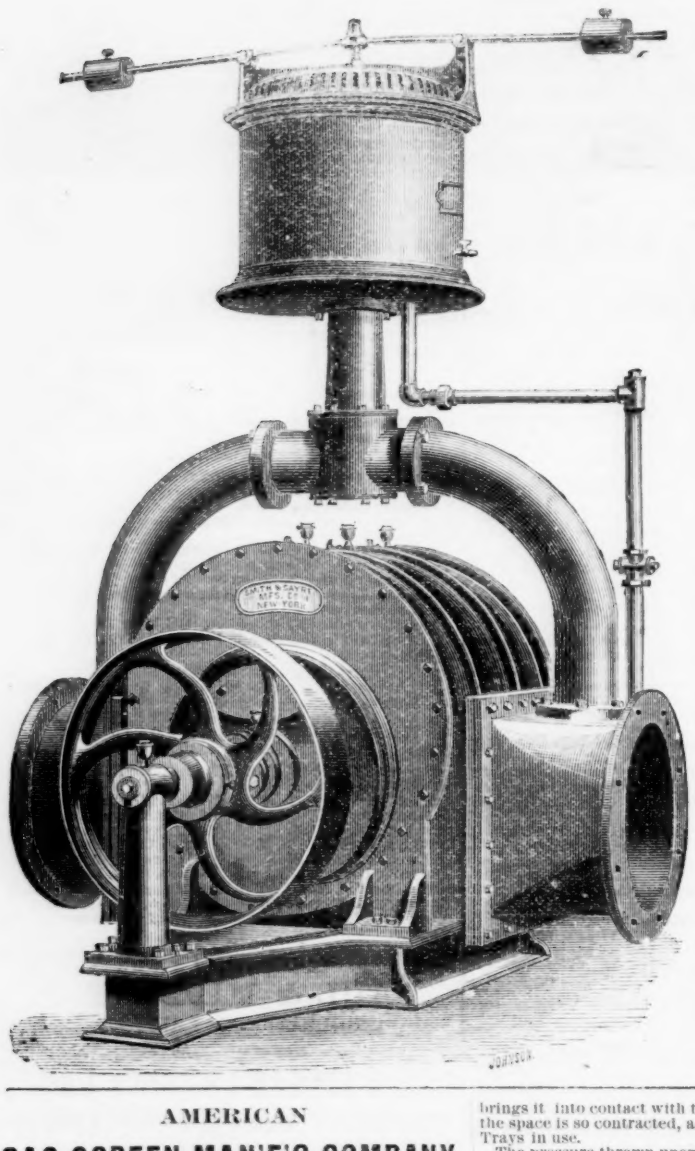

They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

MACKENZIE PATENT BLOWER, PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durable built, and can be driven with one-third the power required to drive the ordinary Fan.

The Cupolas are manufactured in sizes to melt from 1 to 90 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent fuel. Address

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JAMES M. SAYRE, Treasurer.
OFFICE, 95 LIBERTY STREET, New York.
CHARLES W. ISBELL, Secretary.

AMERICAN

GAS SCREEN MAN'F'G COMPANY.

TO GAS-LIGHT COMPANIES.

Your attention is respectfully called to the GAS SCREEN now being manufactured by the American Gas Screen Manufacturing Company, under the patents granted to E. DUFFEE, and are pleased to submit the following points of their excellence and superiority over all other screens now in use.

The Screen is made with an oak frame, interlaced with split rattan, drawn through holes at regular intervals in the Frame and cross-pieces, the edges of the frame being grooved prevent abrasion.

The advantages of the screen are:

1st. The large purifying surface, the construction of the Screen giving over three-fourths of the surface for the gas to penetrate the lime.

2d. On account of the free passage of the gas through the screen the pressure is reduced, thereby preventing the accumulating of carbon on the retorts.

The saving of lime and labor, as the Screens are not to clog, and are easily cleaned.

Their cheapness and simplicity of construction.

5th. Their DURABILITY—they can be used longer than any her now used.

Testimonials.

PROVIDENCE, RHODE ISLAND, March 21st, 1872

E. DUFFEE, Esq., Agent, etc.

Dear Sir: The Trays manufactured by you for our West Station were put in use in September last, and have *given perfect satisfaction.*

The frames are well put together, and I see no reason why ey will not last for a long time. The *very large amount of space* in these Trays gives the gas an easy passage, and brings it into contact with the lime much better than when the space is so contracted, as is the case in most of the other Trays in use.

The pressure thrown upon the retorts by contracted passages is very great, and were gauges used more frequently than they now are in many gas-works, this facat of having *open Trays* would become more apparent to mangers of gas works. The digerence in pressure at this station in passing the gas through your purifiers, is two-tenths (2-10) inches.

The amount of gas purified, per bushel of lime used to this date, is six thousand five hundred and fifty six (6,556) cubic feet.

Respectfully yonrs,
JAMES H. ARMINGTON, Supt.

BOSTON GAS-LIGHT CO., Dec. 1871.

Dear Sir: In answer to your inquiry how we like your Patent Tray for dry gas purifiers, I take pleasure in saying we have used them exclusive of all others, for the last three years, and think them far ahead of any yet offered. The surface being nearly three times that of any other Tray, and their lightness and durability perfectly satisfactory.

Yours respedtfully,
A. M. GILES.

EDWARD DUFFEE, Esq.

EAST BOSTON, JUNE 15, 1871.

Gentlemen: We have used your Screens some five years. They give perfect satisfaction.

I consider them *by far the best Screen* for Dry Lime Purifiers I have seen. Yours truly, A. M. NORTON, Supt.

CHELSEA, May 1, 1871.

Mr. E. DUFFEE.

We are using your Purifying Trays, and find them to be the *best of any* that I have used, and will *purify more gas with less pressure* than any tray that I know. I can fully recommend them, after four years trial, to any Gas Superintendent with perfect safety, as the *cheapest and best Tray made.*

Yours truly, JOHN ANDREW, Sup't.

DORCHESTER, March 3, 1870.

Mr. E. DUFFEE.

Dear Sir: We have had your Gas Trays in constant use for almost one year and six months and find them superior to any others we have ever used, both in point of economy and efficiency. Truly yours, W. B. BROOKS,
Agent Dorchester Gas-Light Co.

JAMAICA PLAINS, MASS., June 21, 1871.

EDWARD DUFFEE, ESQ.

Dear Sir; The Trays ordered by this company three years ago, are getting somewhat worn. I wish to say here that I consider your Trays to be superior to any yet invented, therefore please make us another set at the price named, to be like the sample shown in every way, and oblige Yours truly
JAMES F. ROGERS,
Sup't Jamaica Plains Gas-Light Co.

BROOKLINE, June 11, 1871.

E. DUFFEE, ESQ.

Dear Sir: You will please make a set of Gas Trays for this company as soon as convenient, at price named. In regard to the merits of the Tray, after having them in constant use for over two years, I will say that I consider them *superior to any Tray* manufactured in this country. Respectfully yours,
H. A. ALLYN,
Sup't Brookline Gas-Light Co.

BANGOR, August 2, 1870.

EDWARD DUFFEE, ESQ.

Dear Sir: Yours of the 20th ult. is received. In regard to your Gas Trays, I take pleasure in saying that they have been in use over two years, and have given perfect satisfaction and they are in good order at the present time; should have no hesitation in recommending them, believing they are the most durable and easiest kept in order of any with which I am acquainted. Respectfully yours,
W. H. PERRY, Sup't.

OFFICE OF THE SPRINGFIELD GAS-LIGHT CO.
SPRINGFIELD, MASS., Oct. 10, 1871.

MR. WARD,
President Hartford Gas-Light Co.

Dear Sir: I have been using Gas Screens made by the American Gas Screen Company, for nearly a year, and find them superior in every way to the wooden Screens made and formerly used by the Springfield Gas-Light Co. I can purify more gas with the same quantity of lime, there being more surface to the Screens; and I consider them more durable. and recommend them to your consideration.

Yours with great respect,
GEORGE DWIGHT.

ROXBURY, June 14, 1872.

EDW. DUFFEE, ESQ.

Dear Sir: In answer to your inquiry regarding your Patent Gas Screens, I am happy to be able to say, that after nearly three years constant use we are perfectly satisfied with them being able to purify over fifty pet cent. more gas with them, than with any other Screen we have used.

Yours respectfully,
THOMAS J. PISHOU

OFFICE DETROIT GAS-LIGHT CO.,
DETROIT, MICH., April 22, 1872.

AMERICAN GAS SCREEN MANUFACTURING CO., HAVERHILL.

Gentlemen: The Screens bought of you work far better than any we have ever used. As a proof, we have with the same quantity of lime purified *twenty per cent.* more gas with your Screens than with any others, and the work well done. The workmen are also better pleased wifh them—they being light and handy to work. They also relieve the pressure very much upon the retorts, and I cheerfully give yau my experience.

Yours truly,
P. E. DEMILL. Secretary.

We give a list of some Gas-Light Companies using them.

Providence, R. I. Gas-Light Co.. Boston, Mass. Gas-Light Co.: East Boston, Mass., Gas-Light Co.; South Boston, Mass. Gas-Light Co.; Springfield, Mass., Gas-Light Co.; New Bedford, Mass., Gas-Light Co.; Manchester, N. H., Gas-Light Co.; Reading, Penn., Gas-Light Co.; Biddeford, Me., Gas-Light Co.; Hartford, Conn., Gas-Light Co.: New Haven, Conn., Gas-Light Co.; New Orleans, La., Gas-Light Co.; Savannah, Ga., Gas-Light Co.; Charleston, S. C., Gas- Light Co.; Trenton, N. J., Gas-Light Co.; Charlestown, Mass., Gas-Light Co.; Dorchester, Mass., Gas-Light Co.; Chelsea, Mass., Gas-Light Co.; Baltimore, Md., Gas-Light Co.; Manhattan, N. Y., Gas-Light Co.; Cincinnati, Ohio.; Gas-Light Co.: San Francisco, Cal., Gas-Light Co.: Albany, N. Y., Gas-Light Co.; Sacramento, Cal.; St. Joseph, Mo., Gas-Light Co.; Leavenworth, Kansas, Gas-Light Co.; Macon, Ga., Gas-Light Co.; Roxbury, Mass., Gas-Light Co.; Lansinghburg, N. Y., Gas-Light Co.; Bridgeport, Conn., Gas-Light Co.; Stamford, Conn., Gas-Light Co.; Poughkeepsie, N. Y., Gas-Light Co; Scranton, Penn., Gas-Light Co.; Lewiston, Me., Gas-Light Co., and one hundred others.

Address **A. P. JAQUES, Treas.,**
Amer. Gas Screen Man'f'g Co., Haverhill, Mass

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IN THE

Manufacture of Coal Gas,

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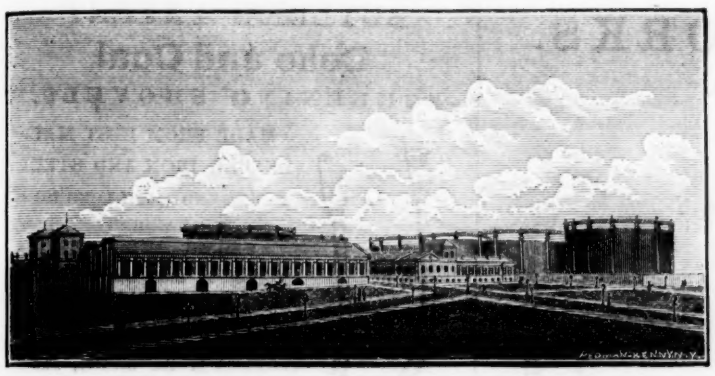
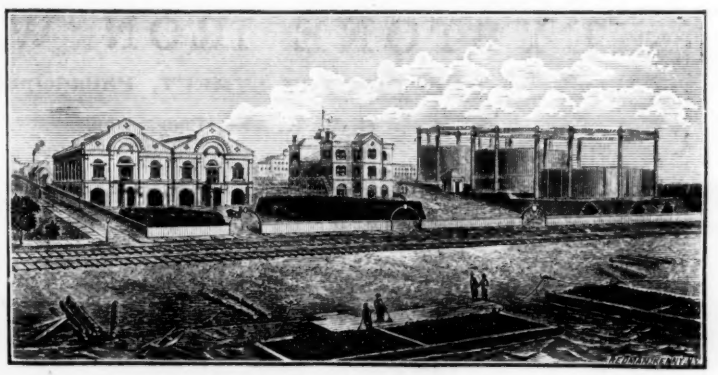
Orders for fitting up Valves of any desired form or patent, *subject to the generality of the Gibson claim*, and also for SUPPLIES and MATERIALS of every description required for the use of Gas Light Companies promptly attended to by

W. H. GRENELLE, Special Agent.

REFERENCE.—RICHARD MERRIFIELD, Esq., late Vice President MANHATTAN GAS-LIGHT COMPANY.



CINCINNATI GAS WORKS, ERECTED 1871-72-73.—WM. FARMER, ENG.



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Blowers for Forges, Foundries, &c.
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A. W. BENSON, President Brooklyn Gas-Light Company, Brooklyn, N. Y.
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Has purified, per bushel, on a single test, 10,000 feet of Westmoreland Gas. With revivification lasts indefinitely. Surpasses in POWER and ECONOMY all known materials. Saves largely in FIRST COST, SPACE, LABOR, SUPERINTENDENCE, and all current expenses. Will purify *easily* sulphurous gas, wholly *unmanageable by lime.* Takes out *all the ammonia.* Now operating in the following Gas Works: Harlem, New York (21st street); Port Morris; Hunter's Point; East New York Worcester, Lynn and Cambridge, Mass.; Lewiston, Maine; St, Albans, Vt.; Pawtucket, R. I.; Meriden, Ct.; and being introduced in many other places.

Cost 70 cents per bushel. One bushel for each square foot of Purifier sufficient. Rights to use for life of Patents, for daily makes of gas in thousands; under 25,000 $200; under 50,000, $400; under 100,000, $500; $250 additional for each additional 50,000 per day.

For further information and instructions, apply to
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21st Street and Avenue A, New York Gas Works.

☞ Immediate arrangements are urged, as the demand for e prepared composition is increasing *so rapidly* that delays supply may occur.

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Gas and Water Mains.

All sizes from 3 to 30 inch cast vertically in 12½ feet lengths

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OHIO GAS CANNEL,
From the Sterling Colliery.

We are now prepared to place in the market, through our agents as below, a regular and unlimited supply of this valuable Cannel, for gas purposes. The analysis made in 1871 by Prof. WURTZ, Editor of this Journal, at the Laboratories of the NEW YORK GAS-LIGHT COMPANY, gave 47½ per cent of Volatile Matter and 45 bushels to the ton of a fair quality of coke. The yield of gas was at the rate of 9,500 feet per ton of about 27 candle power. It is not highly sulphurous, can be purified by Lime, and the ash from the coke does not clinker. The above test has been fully substantiated as correct, and can confidently recommend trial of the coal.

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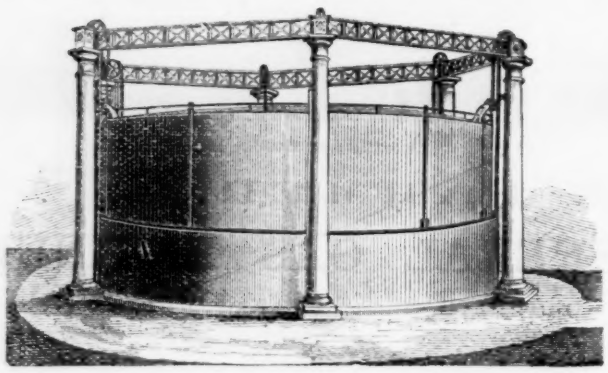

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96 Maiden Lane, N. Y.

OFFICE OF

THE GAS-LIGHT CO. OF AMERICA.

C. K. GARRISON, President.
E. W. McGINNIS, Secretary and Treasurer.
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LEONARD D. GALE, Consulting Chemist.

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Gale and Rand Patents,

and we are now prepared to treat with you for the use of said process by your Company.

We are also prepared to contract for putting said process into successful operation in your works, furnishing all the necessary plans, materials, and workmen for that purpose.

We do not deem it necessary to enter upon a detailed description, here, of the processes above referred to, deeming it sufficient to state, to secure your interest and investigation, that they have been in successful operation, for months, in a number of Gas-Light Works in the United States, and are now being introduced in the works of the Mutual Gas-Light Company, of New York City; the Citizens' Gas-Light Company, of Brooklyn; the New Orleans, San Francisco, and very many other Gas-Light Companies throughout the country.

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DESPARD COAL

To Gas Light Companies throughout the country.
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We offer special inducements to parties wishing to purchase. My Pipe is Smooth, regular in weights, and cast vertically.

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37-3m

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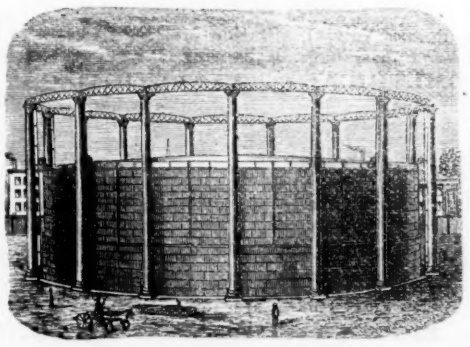

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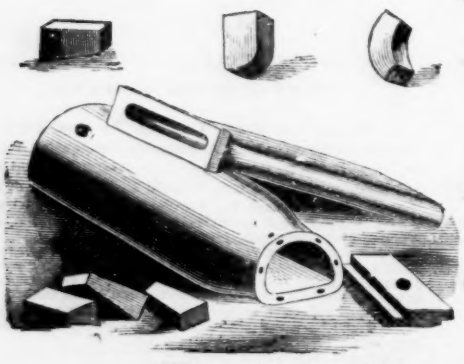

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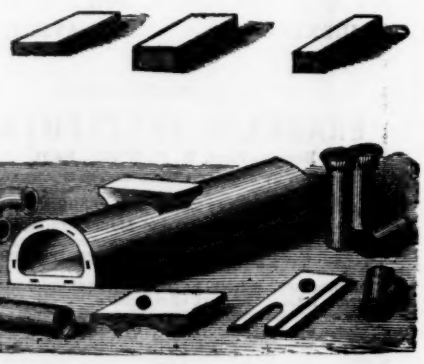

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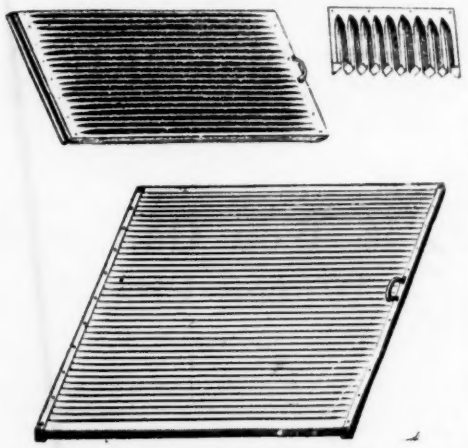

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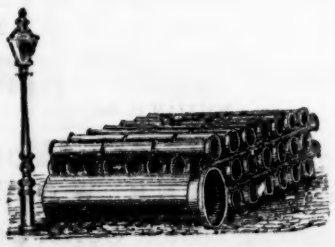

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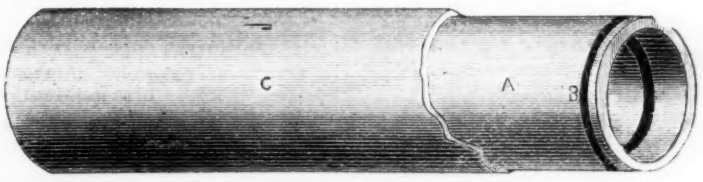

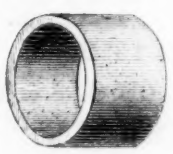

FIG. 2.

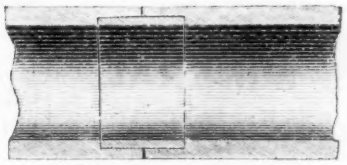

FIG. 3.

A—Cylinder of Wood. B—Band of Iron. C—Coating of Hydraulic or Asphaltum Cement.

FIG. 2.—Thimble for Connection. FIG. 3—Horizontal Section and Connection.

Above is a cut of the

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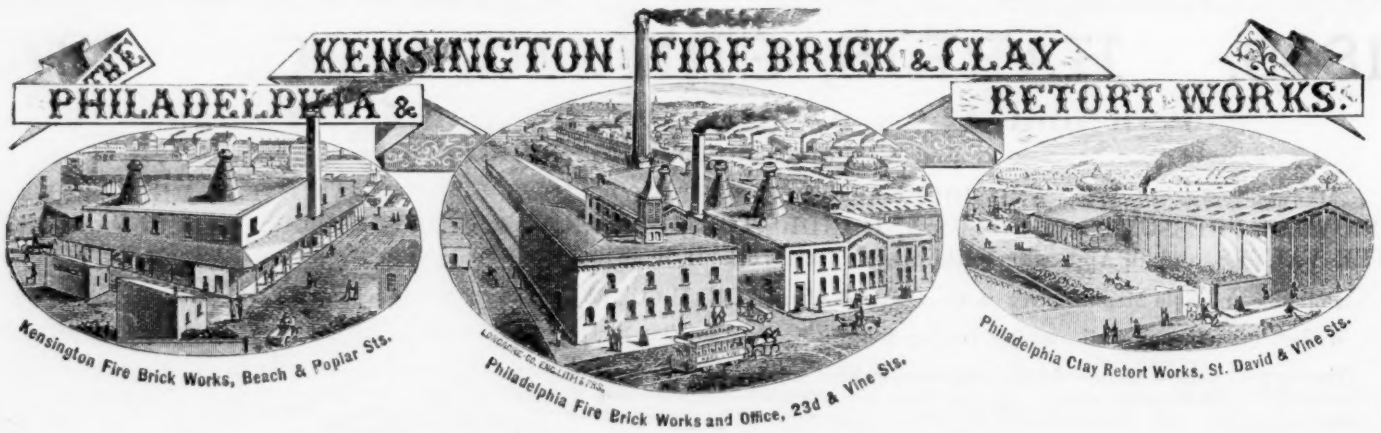
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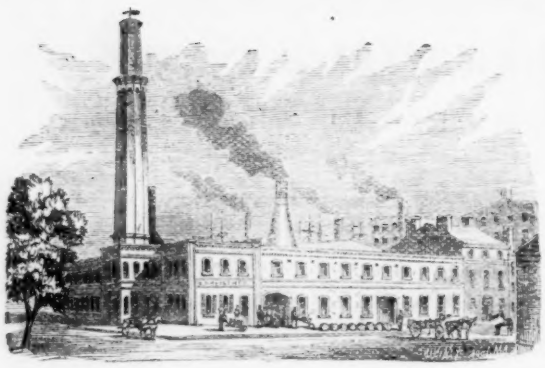

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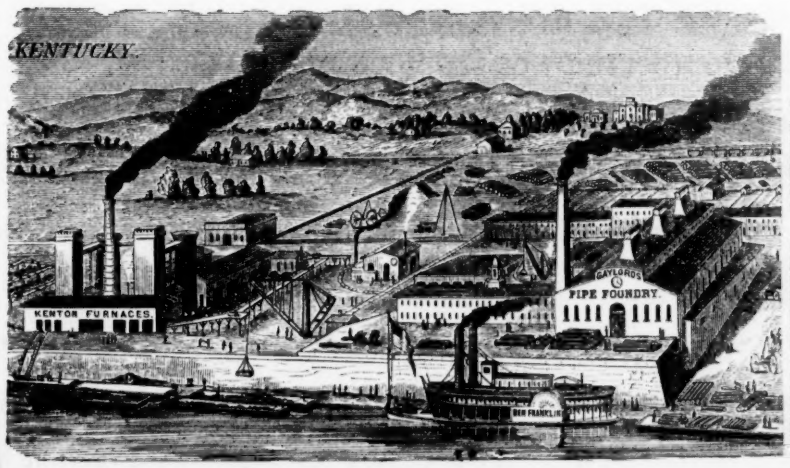

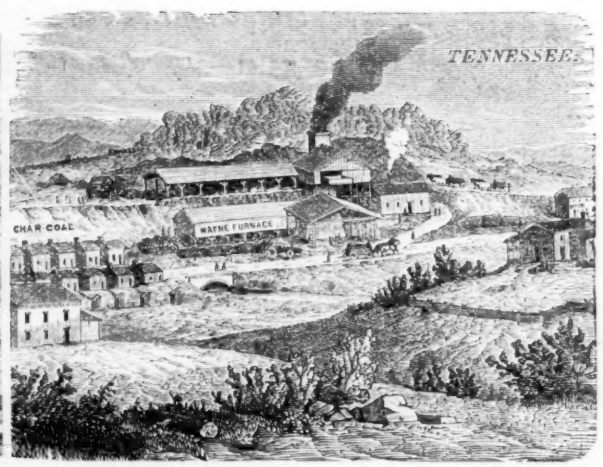

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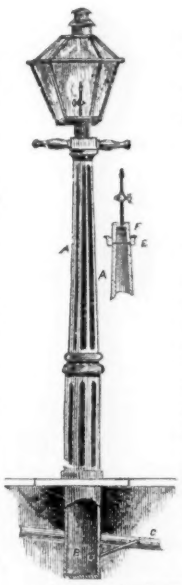
This process is not only safe, simple and effective, but costs little to apply. The only machinery necessary is a one and a half inch stop cock, and a half inch stop cock to each bench No alteration in the old system is required. In fact, a Works operated with this process, can at any time be operated on the old pressure system, simply by closing the two stop cocks above mentioned. There is nothing to get out of order, nothing that requires special attention; no stuffing-boxes to pack and keep tight, no valves to keep clear of tar and pitch, no levers to lubricate, and no expense for a great amount of machinery.

The McIlhenny process challenges the world as regards yield and quality of gas.

For particulars apply to GEO. A. McILHENNY, Engineer of the Washington Gas-Light Co., Washington, D. C., or to WILLIAM YORKE, Engineer of the Portland Gas-Light Co., Portland, Me., who will take pleasure in corresponding with any one interested. 30?-1y

GRAHAM'S

Patent Anti-Freezing LAMP POST.



THE BEST, CHEAPEST AND MOST DURABLE POST EVER OFFERED TO THE PUBLIC.

WOOSTER, OHIO
Jan. 24, 1871.

J. W. GRAHAM,

Dear Sir: Yours of the 14th inst at hand. In reply I would say that we have tested the six anti-freezing Lamp Posts purchased from you, and find them to be all as you represented. Whilst nearly a dozen of our sixty-five Posts were frozen down last month and first of this not one of yours was affected by the heavy frost. What can you sell them at?

Yours truly,
LUCAS FLATTERY
Sec'y Wooster Gas-Light Co.

Address the Patentee,

J. W. GRAHAM,

250-9t Chillicothe, Ohio.

THOMAS T. TASKER JR. STEPHEN P. M. TASKER.

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WROUGHT IRON ROOF FRAMES.—For Slate, or Corrugated Iron Coverings, with Cast Iron Cornice Gutter. Iron Doors and Frames, Wrought Iron Pivot Blinds, Windows and all kinds of Castings and Smith Work for Buildings.

BENCH CASTINGS.—Retorts, and all Castings and Wrought Iron Work required for Setting them on the Latest Plan. Tar Gates, Wrought Iron Stand Pipes, Retort Lids, Cotter Bars, Coal and Coke Wagons, and Stokers' Tools.

EXHAUSTERS.—Exhausters and Compensators, By-Passes to pass from 4,000 to 150,000 Cubic feet of Gas per hour, with Engines, Governors, Pressure and Vacuum Guages.

SCRUBBERS.—Single or Multitubular Scrubbers, with Self-Acting Pumps for Ammonia Water.

WASHERS.—Cataract and Single and Multitubular Spray Washers

CONDENSERS.—Single and Multitubular Air and Water Condensers.

PURIFIERS.—For Purifying from 1,000 to 2,000,000 cubic feet capacity daily, with either wet or dry Lime, or Oxide of Iron, and with either Ash Rivetted or Wrought or Cast Iron Lime Sieves.

CARRIAGES.—Movable Lifting Carriages for Purifiers, arranged either for Floor or Overhead use.

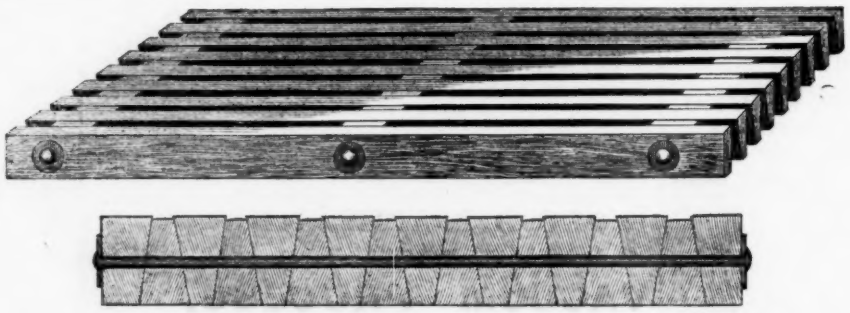
METERS.—Square and Round Meters of any capacity.

GAS HOLDERS.—Single Lift and Telescopic Gasholders, with Cast or Wrought Iron Suspension Frames.

GAS GOVERNORS.—Station Governors, with Regulating and Indicating Columns for Inlet and Outlet Pipes, also Dry Governors with Flexible Diaphragms for Underground Pipes.

STOP VALVES.—Double Faced Stop Valves for Gas or Water, from three inches to forty-eight inches diameter. These Valves are proved on both sides, with a heavy Water Pressure, Flange and Bell Pipes, Fittings and Drips of all descriptions. Steam Boilers and Hot Water Apparatus for Heating Building, and Gas Holder Tanks. Lamp Posts and Lanterns.

P. Munzinger's Patent Ash Lime Trays.



In use at the following Gas-Light Companies:

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Utica Gas-Light Comwany, N. Y.
Jersey City Gas Company, N J.
St. Paul Gas-Light Company, Minn.
Cumberland Gas-Light Company, Md.
Hartford City Gas-Light Company, Conn.
Richmond Gas Company, Va.
McKeesport Gas Company, Pa.
Middletown Gas Company, Pa.
East Newark Gas-Light Company, N. J.
Binghampton Gas Company, N. J.
Zanesville Gas Company, Ohio.

New Orleans Gas Company, La.
Salem Gas-Light Company, Mass.
New Britain Gas-Light Company, Conn.
Rahway Gas-Light Company, N. J.
Trenton Gas-Light Company, N. J.
Elmira Gas Company, New York.
Erie Gas Company, Pa.
Columbus Gas-Light Company, Ohio,
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Coatesville Gas-Light Company, Pa.
Houston, Gas Company, Texas.
Wilkesbarre Gas Company, La.
Middletown Gas Company, New York.
Washington Gas-Light Company, Pa.
Princeton Gas-Light Company, N. J.
Newark Gas Company, Ohio.
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And numerous other Companies.